about an hour. On several occasions paraselenae have been observed, and on clear, cold nights a full moon shining through a few thin alto-cumulus clouds sometimes produces coronas that are wonderful to observe. In this connection might be mentioned the colored alto-cumulus and alto-stratus clouds that are sometimes observed when no parhelia or halo is present. Usually these are small detached clouds about 15° to 20° from the sun. They may include all the colors of the rainbow and resemble delicate mother-of-pearl.

AURORAS

As might be expected in this latitude, auroral displays are frequent. There is an average of 176 days annually on which they are recorded. There seems to be a popular belief that the aurora is generally associated with cold weather. Records at Fairbanks show little connection between this phenomenon and prevailing weather conditions. No auroras are observed during the summer season, simply because they are not visible during the continuous daylight. By the end of July there is a short period of deep twilight at midnight, and the brightest stars are once more visible. The darkness rapidly increases, and 2 weeks later the first aurora may be observed. The displays are frequent from this time until May, when continuous daylight again prevails. During the past 4 years the physics department of the Alaska Agricultural College near Fairbanks has been measuring the height of the aurora by means of simultaneous photographs at stations about 15 miles apart. The general height as determined from these measurements ranges between 60 and 200 miles.

EARTHQUAKES

No severe or destructive tremors have been recorded in the interior of Alaska. However, the number of light shocks averages eight annually. The center of disturbance seems to be to the southwest, near the "Valley of Ten Thousand Smokes." Many active volcanoes are located in this region. The eruption of Mount Katmai in 1912 was one of the most terrible known anywhere on the earth.

AVIATION

Commercial aviation is playing such a great part in the development of interior Alaska that this article would hardly be complete without a few remarks regarding this modern means of transportation. For about 15 years following the discovery of gold, the shallow-draft river boats furnished the only means of summer transportation. In winter all traveling was by dog sled and this condition still prevails over much of the country. In 1905 the Alaska Road Commission was organized and a road was constructed from Valdez, on the coast, to Circle City on the Yukon River, a distance of 500 miles. In addition to this trunk line a few miles of feeder roads, mostly in the Fairbanks district, have been constructed as the need arose. On the high passes the road is blocked by snow from October to the middle of June each year. When the Alaska Railroad was completed in 1923 the interior country became easily accessible the year round. The railroad extends from Seward, on the coast, to Fairbanks a distance of 470 miles. The weekly trains make connections with the steamboats and one may now travel from Seattle to Fairbanks in 8 days. Upon the completion of the railroad Fairbanks became the distributing center for central and western Alaska. Travel and transportation had greatly improved since the pioneer days at the beginning of the century. However the interior country is a vast region equal in size to the State of California. With but one road and one railway, the transportation system was about equal to that of the Middle West at the close of the Civil War. The introduction of commercial aviation has brought about wonderful changes during the last 10 years. The late Col.

Form No. 1131-Aer.

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

PILOT'S WEATHER REPORT

Date January 14, 1934. Time A.M. Issuing station Fairbanks, Alaska.

STATION	ELEVATION (FEET)	TIME (A. M. OR P. M.)	GENERAL CONDITION	CEILING (FEET)	VISIBILITY (MILES)	WIND DIRECTION AND VELOCITY	TEMPERATURE (DEG. F.)	DEW POINT (DEG. F.)	BAROMETER (SEA LEVEL)	REMARKS—FIELD CONDITION
Fairbanks		8a	dense fog	zero	zero	calm	-62		30.40	
Nenana		745a	clr	unl	unl	calm	-64		30.38	grnd.fog w
Hot Springs		730a	clr	unl	unl	calm	-70		30.02	patches grnd.fog
Tanana		745a	clr	unl	unl	calm	-62		29.95	
McGrath		8a	clr	unl	unl	e 1	-65		29.90	patches grnd.fog
Richardson		745a	clr lt fog	unl	poor	calm	-54			
McCarty		745a	dense fog	zero	zero	e 4	-51			
Jarvis		745a	dense fog	zero	zero	calm	-50			
Circle		730a	clr	unl	unl	calm	-70		29.62	
*Fort Yukon		745a	clr	unl	unl	calm	-76		30.32	lt.grnd.fog on river to S.
Eagle		845a	clr	unl	unl	calm	-49		29.20	
			*Temperature on river at Fort Yukon reached -78° at 11 am.							

Ben Eielson inaugurated air-mail service about 10 years ago, when experimental flights were made from Fairbanks to McGrath. The distance of 300 miles required 17 days by dog sled as compared to 2 hours and 45 minutes by plane. These flights demonstrated completely the practicability of air transportation and the citizens of Alaska are without doubt now more "air minded" than the people of most countries. Landing fields have been constructed at practically every mining settlement and throughout the year a day seldom passes without flights being made to some remote section of the country. The 5-hour flight to Nome is made several times each week. By dog sled, with the best of trail and weather conditions,

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

PILOT'S WEATHER REPORT

Date January 14, 1934

Time A.M.

SPECIAL REMARKS

S-4573

WINDS ALOFT, ALTITUDES IN FEET ABOVE SURFACE

STA. Fairbanks ELEV. 455		STA. Nome ELEV. 8 1		STA. ELEV.		DE	
ALTITUDE (FEET)	DIR.-VEL. (MPH.)	ALTITUDE (FEET)	DIR.-VEL. (MPH.)	ALTITUDE (FEET)	D		DIR.-VEL. (MPH.)
Foggy	None	Surf	wnw 4				
		1000	wnw 2				
		2000	nnw 2				
		3000	nne 8				
		4000	ne 24				
		5000	nne 28				
		6000	nne 28				
		7000	n 32				
		8000	n 34				
		8600	n 34				

this trip usually required 3 weeks. Planes go almost daily to the nearby settlements and at frequent intervals flights are made to Bethel, Kotzebue, Wiseman, Fort Yukon, Dawson, and other distant points. Occasional trips are made to Whitehorse and to Point Barrow. An idea of the important and varied services rendered by the aviation companies may be gained from the following incident. At 2 a. m. this radio message was received from Point Barrow, "Rush a plane to Cape Halkett Mrs. ——— and child seriously ill matter of life and death". At 4:45 a. m. a plane left Fairbanks, stopped at Wiseman 200 miles away for gasoline, and went on to Cape Halkett, located on the Arctic coast 100 miles east of Point Barrow. The mother and child were in the Point Barrow hospital at 11:10 a. m., the plane having covered a distance of over 600 miles in 6½ hours.

In general, aviation work is perhaps much the same the world over, but in many regions special conditions arise which the pilot must know how to meet. Trouble is very likely to follow if the seemingly insignificant details are ignored. The only hangars available in the interior of Alaska are those located at Fairbanks. When planes are forced to remain outdoors in cold weather they frequently become coated with frost in a very short time. This must be wiped off, as the frost so disturbs the airflow over the wings that their lifting power is lessened and a take-off is hazardous. In cold weather the oil must be drained from the motor immediately after landing. Before beginning a flight the motor is covered with a canvas hood and warmed with a gasoline torch. The oil must be heated, poured in, and the warmed motor started at once. In cold weather the preparations for a flight often require considerable time. Forced landings in the uninhabited country might prove quite serious; and as landing fields may be 100 miles or more apart, the planes must always be kept in perfect condition. The efficiency and safety of commercial aviation in interior Alaska may be judged from the fact that in 10 years there have been but two plane crashes in which passengers have been killed. Surely there are few countries with such a record. Forced landings are almost unknown, yet they must be taken into consideration and ever be guarded against. As emergency equipment the planes carry several days' rations, a rifle and camping equipment. This and the extra gasoline needed often greatly reduces the pay load of the planes. Experience soon shows the necessity of an extra supply of gasoline, which in some communities costs $2 per gallon. On a recent attempted flight to Point Barrow the pilot was forced to turn back on account of fog when but a few miles from his destination. The nearest landing field was at Wiseman, 300 miles back across the Endicott Mountains. Another plane flying from Fairbanks to Kotzebue was unable to land at the latter place and was forced to return 250 miles to the landing field at Ruby. As a rule flying activities cease when the temperature falls to 40° or 45° below zero, but this is not always the case. There are any number of flights made in temperatures of −50° and −60°. The coldest flight on record for Alaska and perhaps the coldest made anywhere in the world occurred at Eagle in January 1934, when a temperature of 71° below zero was recorded. For 6 months of the year all planes operate on skiis and landings can be made almost any where on the snow-covered ground. In summer both wheels and pontoons are used. The planes equipped with pontoons have no trouble in landing on the numerous streams, but those on wheels are limited entirely to the few widely scattered landing fields. River transportation is available only when the streams are open and sled travel is limited to the winter months when snow is on the ground. There occurs a period of several weeks each year when the streams are closing and again during the spring break-up, when the only means of transportation is that furnished by airplanes.

For a number of years there was no Airways Weather Service and pilots often made long flights with no knowledge whatever of prevailing weather conditions along the route. By 1929 air commerce had become so well established that the need of an adequate Airways Weather system was apparent. Fairbanks was made a first-order station and became the headquarters for airways work in the interior country. Observers were appointed at

places where radio communication was available and weather reports are now being received once or twice a day from about 30 stations. A number of settlements having landing fields and being frequently reached by plane are without radio communication. As a result an unusual condition prevails in that transportation is ahead of communication. Aviation is advancing rapidly and the Government has done much to aid this important means of transportation. Yet much remains to be done. There are no teletype lines bringing in their hourly weather sequences, no network of off-airway reports to enable the meteorologist to issue frequent trip forecasts, no lines of beacon lights to guide the pilots during the long winter nights, no radio beacons for the planes to follow in bad weather, no emergency landing fields at short intervals and no Department of Commerce radio stations to send out forecasts and warnings to pilots in the air.

CONCLUSION

To the early explorers drifting down the great Yukon River in summer, interior Alaska seemed a land of dismal swamps and jungles in which "the vegetation attains an almost tropical luxuriance." A land of sweltering heat forever condemned to the hordes of gnats and the mosquitoes "that measure 6 inches from wing to wing."

To the lonely prospector mushing over the bleak, barren hills ever in search for gold, Alaska was pictured as a land of "6 months night when 'twas 60 below with howling wind and pelting snow", a region to be tolerated only as long as "pay dirt" could be found.

To the permanent settlers who built their homes in the Far North, the country with its quaint pioneer life, its picturesque winter landscapes, its abundance of game, its profusion of berries and wild flowers soon became a region as dear to their hearts as the palm-fringed lagoons are to the South Sea islanders.

The meteorologist finds in the country with its great temperature extremes, its remarkable changes in weather, its halos and auroral displays, a region so full of interest that he cannot help but become enthusiastic in his work. Surely there are few regions in the world as interesting as the interior section of Alaska.

Monthly normal temperatures (°F.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks	−10.8	−0.1	10.2	28.5	47.3	58.5	60.3	55.5	43.5	26.4	3.1	−6.2	26.3
Tanana	−13.0	−5.0	5.5	23.8	44.3	56.8	58.4	53.3	40.8	22.8	.3	−10.7	23.1
Rampart	−16.3	−7.0	3.9	22.8	44.4	57.3	59.4	54.6	41.3	21.6	−1.2	−11.3	22.4
Allakaket	−24.2	−9.8	−3.7	16.3	41.2	55.9	58.2	51.9	39.0	17.6	−10.7	−18.2	17.8
Fort Yukon	−22.6	−15.1	−.2	20.5	42.8	57.8	61.2	54.7	42.1	20.0	−5.9	−21.3	19.5
Circle	−11.8	−17.7	.6	20.6	42.0	57.4	61.3	54.7	38.0	14.6	−10.3	−12.7	19.7
Eagle	−13.4	−4.1	7.4	26.9	44.7	56.0	59.1	53.5	42.1	25.2	3.6	−10.9	24.2
Dawson	−21.0	−12.0	4.0	27.9	46.1	56.7	59.5	54.3	42.3	25.6	1.4	−14.0	22.6

Absolute maximum and minimum temperatures (°F.)

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks		40	47	56	65	86	95	99	90	80	67	48	43	99
		−66	−57	−56	−32	9	28	30	19	11	−21	−54	−59	−66
Tanana		40	43	53	63	82	91	89	90	78	67	38	37	91
		−76	−68	−57	−40	−4	23	29	18	3	−27	−68	−68	−76
Rampart		40	42	52	75	86	97	97	96	85	60	37	37	97
		−68	−64	−49	−33	0	24	31	23	7	−28	−57	−61	−68
Allakaket		32	40	44	53	77	86	88	86	79	45	33	34	88
		−70	−70	−68	−42	−17	27	27	19	−3	−41	−61	−69	−70
Fort Yukon		40	41	50	60	85	100	93	87	79	61	36	37	100
		−67	−70	−50	−41	−3	25	27	22	8	−30	−60	−68	−70
Circle		36	28	38	64	78	84	96	90	84	46	41	32	96
		−66	−58	−55	−32	6	32	35	19	2	−18	−52	−53	−66
Eagle		41	45	56	68	85	92	95	87	79	68	48	42	95
		−75	−74	−56	−38	2	23	25	16	2	−28	−54	−69	−75
Dawson		32	34	48	69	85	91	93	86	77	68	47	32	93
		−68	−62	−47	−33	9	25	29	17	8	−23	−48	−63	−68

Average number of days with temperature 32° or lower

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks	31	28	31	29	12	0	0	2	15	29	30	31	234
Tanana	31	28	31	29	15	1	1	4	14	29	30	31	244
Rampart	31	28	31	30	17	1	0	3	17	30	30	31	249
Allakaket	31	28	31	30	22	1	1	6	18	30	30	31	259
Fort Yukon	31	28	31	29	18	1	0	3	15	30	30	31	247
Eagle	31	28	31	29	18	2	1	6	16	28	30	31	251
Dawson	31	28	31	28	14	1	0	3	14	28	30	31	239

Average number of days with temperature—

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks:													
Zero or lower	27	20	19	5						5	21	26	120
70° or over					3	16	21	12	1				54
Tanana:													
Zero or lower	25	19	19	7						4	18	25	117
70° or lower					1	14	15	9	0				39
Rampart:													
Zero or lower	28	24	22	8						4	20	27	133
70° or over					2	15	18	11	1				47
Allakaket:													
Zero or lower	30	23	26	16						9	21	28	153
70° or over					1	8	16	10	0				35
Fort Yukon:													
Zero or lower	30	26	17	11						6	23	30	143
70° or over					2	15	19	10	1				47
Eagle:													
Zero or lower	26	20	19	6						3	17	25	116
70° or over					2	17	20	13	1				53
Dawson:													
Zero or lower	27	24	20	6						2	16	29	124
70° or over					2	17	22	12	0				53

Mean monthly and annual precipitation (inches and hundredths)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks	0.81	0.47	0.79	0.30	0.57	1.42	1.96	1.91	1.46	0.75	0.71	0.62	11.77
Tanana	.75	.77	.61	.26	.80	1.23	2.36	2.41	1.83	1.07	.70	.68	13.50
Rampart	.63	.61	.44	.21	.51	1.11	1.39	1.59	1.36	.98	.53	.62	9.98
Allakaket	.74	.93	.71	.40	.65	1.20	1.68	1.64	1.41	1.06	.66	.97	12.05
Fort Yukon	.38	.43	.29	.29	.50	.85	1.04	1.17	.70	.60	.30	.32	6.87
Circle	.80	.32	.61	.84	.68	.88	1.89	1.85	1.86	.78	.43	.72	11.65
Eagle	.45	.35	.39	.41	.84	1.50	1.78	2.00	1.28	.79	.51	.42	10.72
Dawson	.84	.76	.51	.54	.90	1.19	1.52	1.51	1.46	1.15	1.11	1.04	12.53

Monthly and annual snowfall (inches and tenths)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks	8.7	5.5	9.4	2.6	0.4	0	0	T	0.4	5.6	5.5	8.5	46.6
Tanana	11.3	10.1	10.4	3.1	.6	T	0	0	1.1	8.8	8.0	10.0	63.4
Rampart	10.5	7.7	5.2	1.9	.1	.2	0	0	.9	8.8	7.8	6.3	49.4
Allakaket	13.0	15.8	14.3	6.4	.5	0	0	0	1.2	8.8	10.8	14.6	85.4
Fort Yukon	6.2	7.8	5.0	1.9	.4	0	0	T	1.0	7.1	6.9	5.9	42.2
Circle	5.6	3.6	6.0	5.9	3.1	0	0	0	11.5	7.2	4.8	8.0	55.7
Eagle	7.9	4.2	5.3	3.4	.4	0	0	.3	1.8	7.7	8.0	9.9	48.9
Dawson	8.2	7.7	5.3	1.8	.2	0	0	0	1.5	8.4	12.2	10.5	55.8

Greatest and least monthly and annual precipitation (inches and hundredths)

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Fairbanks:														
	Greatest	3.30	1.24	3.72	0.98	1.38	3.25	4.11	3.70	5.61	2.57	4.65	1.52	18.73
	Least	.05	0	T	T	T	.30	.12	.67	.09	T	.11	.15	7.73
Tanana:														
	Greatest	3.16	3.39	2.90	1.01	1.57	2.20	5.18	3.80	2.32	4.40	3.42	2.68	17.69
	Least	.05	.03	T	0	.16	.20	.57	.74	.35	.22	.03	T	7.85
Rampart:														
	Greatest	1.17	3.65	1.42	1.30	1.04	3.03	3.32	3.38	3.01	2.88	1.43	1.99	15.53
	Least	T	.05	T	T	.04	.15	.43	.46	.18	.03	.04	.00	5.32
Fort Yukon:														
	Greatest	1.95	1.33	.80	3.08	4.60	2.40	1.67	1.47	.56	2.37	.88	1.10	[1] 6.87
	Least	.10	.03	.16	T	T	.22	.32	.09	.03	.19	.10	.04	4.14
Eagle:														
	Greatest	1.45	1.23	2.19	1.19	2.87	3.30	2.56	4.73	3.38	2.96	1.27	1.10	13.46
	Least	.09	T	0	0	.18	.37	.46	.61	.01	.07	.07	T	6.30

[1] Annual mean.